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Grooved Director Aids Fascial Enlargement and Closure

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ABSTRACT

Gallbladder retrieval following laparoscopic cholecystectomy through the umbilical or epigastric port site is at times tedious, may result in gallbladder perforation from excessive tearing forces applied to the gallbladder or from instrumental perforation while attempting to enlarge the fascia and is very "low tech" compared to the laparoscopic procedure. Port-site herniae develop when the fascia at either site is not closed adequately with sutures because of inadequate vision through the small incision and the concern for inadvertent injury to the tissues underlying the fascia. This study reports the use of a simple instrument, a spoon-shaped grooved director, to aid both the fascial enlargement and the fascial closure. The instrument has been used in more than 30 laparoscopic cholecystectomies and has been found to be simple, safe and effective for fascial enlargement and closure. This reusable instrument should be used routinely for laparoscopic cholecystectomy but offers significant advantages in the obese individual.

Key Words: Laparoscopy, Fascia closure, Groove director.

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INTRODUCTION

Laparoscopic cholecystectomy is the standard method of performing cholecystectomy in both the elective and the acute setting. Removal of the gallbladder through the abdominal wall either at the epigastric or subumbilical port site is often aided by enlargement of the fascia, which is required either because of the large size of the gallbladder itself or because of large stones. The enlargement is performed by manually spreading and tearing the fascia with an instrument such as a Kelly forceps or by cutting the fascia with a scalpel. Only rudimentary descriptions exist for the technique of fascial enlargement.[1,2] Even when the gallbladder has been evacuated of all liquid bile, the stones, if multiple and/or single but large, can result in difficulty delivering the gallbladder. The stones can be crushed within the gallbladder but this risks perforation of the gallbladder with bile spillage and often does not eliminate the need for fascial enlargement.[3] The extraction of the gallbladder component of laparoscopic cholecystectomy has suffered from lack of similar technological advances that have occurred in the laparoscopic technique.

The incidence of gallbladder perforation during removal of the gallbladder through the abdominal wall as opposed to intra-abdominal laceration secondary to dissection has not been reported in any large series. However, experience dictates that methods to enlarge the fascia and excessive traction of the gallbladder do result in laceration with bile and stone spillage into the peritoneal cavity and the trocar wound resulting in the potential for port-site wound infection. The infection rate is reported to be 0.5–1.0% in large series; however, the cause of the wound infection is not identified.[4,5]

Closure of the fascia is the final step in a successful operation. A late port-site hernia may develop in 10 mm trocar sites in which the fascia has not been closed with sutures. Some large series do not even report this complication,[6] while others report complication rates for trocar-site herniae of 0.12–0.5%.[4,5] This is often difficult to adequately visualize, particularly in the obese patient, and the risk of including intra-abdominal structures such as small bowel exists during the fascial closure. This report describes a simple, safe, cost-effective, reusable instrument and technique for fascial enlargement and closure.

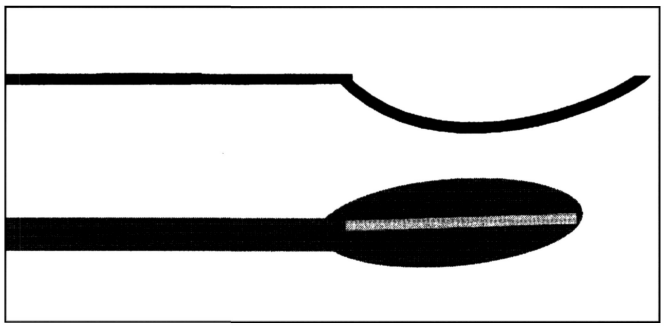

Figure 1. The grooved director is viewed in cross-section (top picture) and from the top (bottom picture) showing the groove.

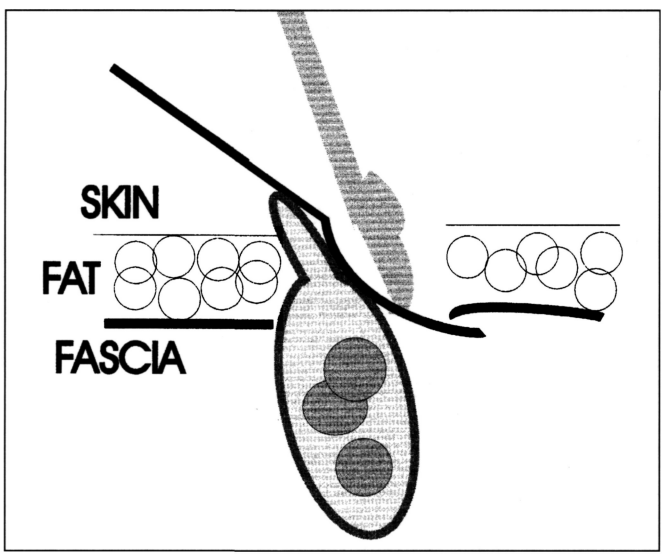

Figure 2. The grooved director is being used for fascial enlargement with the scalpel being passed along the groove, and the director protects the wall of the gallbladder.

MATERIALS AND RESULTS

The grooved spoon-shaped director SM1N\0497 MAKAR Director (Southmedic Co) was developed to aid in fascial enlargement without injury to the gallbladder or intra-abdominal viscera **(Figure 1)**. The director is placed between the gallbladder wall and the fascia to be incised.

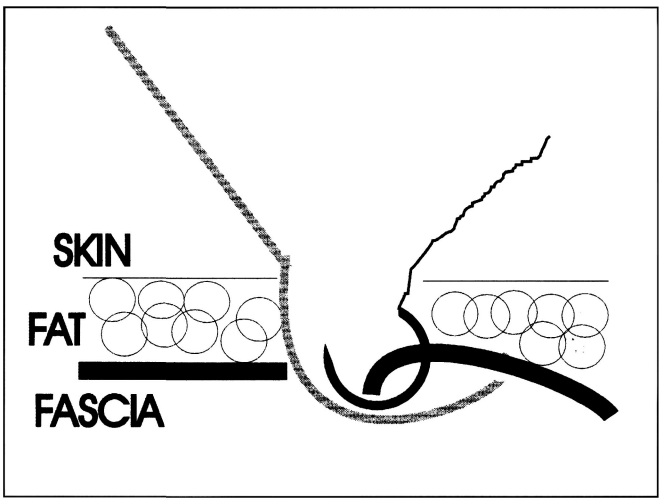

Figure 3. The grooved director is being used for fascial closure. The needle is being placed through the fascia along the groove of the director and the underlying viscera protected by the spoon of the director.

The spoon shape allows for this instrument to be placed under the fascia with ease. The groove allows the scalpel to follow a path along the spoon shape in a safe, secure manner precisely incising the fascia **(Figure 2)**. Other aids in removing the gallbladder can be used in addition to fascial enlargement with the director, including evacuation of bile and crushing of stones within the gallbladder. The blunt forceful tearing of the fascia with an instrument such as a Kelly forceps is avoided, thereby avoiding inadvertent injury of the gallbladder wall as well as uncontrolled, excessive tearing of the fascia. This instrument can be used equally as well in either the epigastric or umbilical trocar sites. In more than 30 laparoscopic cholecystectomies, the grooved director has been used without injury to the gallbladder wall. This was found to be particularly useful in obese patients in whom the fascia was deep to a thick layer of abdominal wall fat and not easily visualized. In these individuals, the director was easily placed beneath the fascia and confirmed by tactile sensation of "lifting" against the overlying fascia. The fascia was then easily incised with a scalpel, avoiding risk to the underlying viscera.

Fascial closure is aided with the grooved director by placing the director beneath the fascia. The fascia is again easily identified by tactile sensation or by direct vision with the aid of skin and subcutaneous tissue retractors. A #1

suture needle will follow the groove of the director through the fascia while all intra-abdominal viscera are protected by the spoon **(Figure 3)**. In the patients, both the epigastric and umbilical ports were closed utilizing this technique without injury to the underlying viscera and with accurate apposition of the fascial edges. In obese patients, the needle follows the groove beneath the fascia without direct visualization of the fascia and is placed safely knowing that the underlying viscera are protected.

CONCLUSIONS

The grooved director is a safe, effective instrument, which aids both the fascial enlargement and closure. It is an instrument that allows for safe extraction of the gallbladder through the abdominal wall without laceration of the gallbladder wall and consequent bile spillage. It also provides a means to perform a safe, secure fascial closure. This instrument and technique improves the "low tech" components of laparoscopic cholecystectomy, ie, gallbladder extraction and fascial closure. The reusable grooved director can also be used in other advanced laparoscopic procedures for fascial enlargement for removal of other organs and closure of any 10 mm port site.

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